DOCUMENT RESUME

ED 071 608 HE 003 744

TITLE	Survey of Changes in Graduate Programs in Higher Education (Tables).
INSTITUTION	American Council on Education, Washington, D.C. Higher Education Panel.
PUB DATE	Jun 72
NOTE	27p.
EDRS PRICE	MF-$0.65 HC-$3.29
DESCRIPTORS	Curriculum Development; *Doctoral Programs; *Educational Change; *Graduate Study; *Higher Education; *Masters Degrees

ABSTRACT

This document presents charts reflecting changes in graduate programs in U.S. universities from 1970-72 and projected changes to take place between 1972 and 1974. Charts are presented by: (1) changes in doctoral and master's programs by type and control of institution; (2) changes in doctoral programs by rating of institution; (3) changes in science and engineering doctoral and master's programs, by type and control of institution; (4) changes in science and engineering doctoral programs, by rating of universities; (5) doctoral and master's programs initiated, eliminated, and inactive by field; (6) the relation of changes in doctoral and master's programs to number of institutions and to estimated number of departments by field; (7) reported reasons for starting doctoral and master's programs, 1970-74; (8) reported reasons for eliminating doctoral and master's programs, 1970-74; (9) principal reported reasons for starting doctoral and master's programs by field; (10) other contributing reported reasons for starting doctoral and master's programs by field, 1970-74; (11) principal reported reasons for eliminating doctoral and master's programs, by field, 1970-74; (12) other contributing reported reasons for eliminating doctoral and master's program by field, 1970-74. Also included is a discussion of the changes in graduate programs in science and engineering as presented by the National Science Foundation. (HS)

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Survey of Changes in Graduate Programs in Higher Education (Tables)

Higher Education Panel
American Council on Education
June, 1972

HE 00 3744

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Table 1

Changes in Doctoral Programs, by Type and Control of Institution

Type and Control	N	Change in Number of Programs						Percentage of Institutions:			
		1970-1972			1972-1974			1970-1972		1972-1974	
		Number Started	Number Eliminated	Net Change	Number Expected To Be Started	Number Expected To Be Eliminated	Net Change	Started Programs	Eliminated Programs	Expect to Start Programs	Expect to Eliminate Programs
All institutions:	813	253	43	210	126	40	86	15.6	4.3	9.8	3.0
Public	412	196	27	169	83	23	60	23.1	5.6	13.6	2.7
Private	401	57	16	41	43	17	26	8.0	3.0	6.0	3.2
Universities:	219	211	38	173	102	35	67	49.8	13.7	29.7	8.7
Public	147	164	27	137	71	18	53	56.5	15.6	33.3	4.1
Private	72	47	11	36	31	17	14	36.1	9.7	22.2	18.1
4-Year colleges:	594	42	5	37	24	5	19	3.0	0.8	2.5	0.8
Public	265	32	0	32	12	5	7	4.5	0.0	2.6	1.9
Private	329	10	5	5	12	0	12	1.8	1.5	2.4	0.0

Source: Higher Education Panel, "Survey of Changes in Graduate Programs in Higher Education," American Council on Education, 1972.

Table 2

Changes in Doctoral Programs, by Rating of Institution

Type and Control	N	Change in Number of Programs						Percentage of Institutions:			
		1970-1972			1972-1974			1970-1972		1972-1974	
		Number Started	Number Eliminated	Net Change	Number Expected To Be Started	Number Expected To Be Eliminated	Net Change	Started Programs	Eliminated Programs	Expect to Start Programs	Expect to Eliminate Programs
All institutions:	813	253	43	210	126	40	86	15.6	4.3	9.8	3.0
"Top Twenty"	20	17	9	8	6	9	-3	70.0	60.0	30.0	30.0
"Intermediate"	728	186	34	152	90	28	62	13.0	3.2	7.4	2.5
"Developing"	65	50	0	50	30	3	27	27.7	0.0	30.8	0.0

Source: Higher Education Panel, "Survey of Changes in Graduate Programs in Higher Education," American Council on Education, 1972.

Table 3

Changes in Science and Engineering Doctoral Programs, by Type and Control of Institution

Type and Control	N	Change in Number of Programs						Percentage of Institutions:			
		1970-1972			1972-1974			1970-1972		1972-1974	
		Number Started	Number Eliminated	Net Change	Number Expected To Be Started	Number Expected To Be Eliminated	Net Change	Started Programs	Eliminated Programs	Expect to Start Programs	Expect to Eliminate Programs
All institutions:	813	163	27	136	83	29	54	12.1	3.0	8.6	2.5
Public	412	128	21	107	64	14	50	16.7	4.4	12.4	1.9
Private	401	35	6	29	19	15	4	7.2	1.5	4.7	3.0
Universities:	219	157	27	130	67	24	43	42.0	11.0	24.7	6.8
Public	147	124	21	103	52	9	43	44.2	12.2	26.5	2.0
Private	72	33	6	27	15	15	0	37.5	8.3	20.8	16.7
4-year colleges:	594	6	0	6	16	5	11	1.0	0.0	2.7	0.8
Public	265	4	0	4	12	5	7	1.5	0.0	4.5	1.9
Private	329	2	0	2	4	0	4	0.6	0.0	1.2	0.0

Source: Higher Education Panel, "Survey of Changes in Graduate Programs in Higher Education," American Council on Education, 1972.

Table 4

Changes in Science and Engineering Doctoral Programs, by Rating of Universities

Type and Control	N	Change in Number of Programs						Percentage of Institutions:			
		1970-1972			1972-1974			1970-1972		1972-1974	
		Number Started	Number Eliminated	Net Change	Number Expected To Be Started	Number Expected To Be Eliminated	Net Change	Started Programs	Eliminated Programs	Expect to Start Programs	Expect to Eliminate Programs
All universities:	219	157	27	130	67	24	43	42.0	11.0	24.7	6.8
"Top Twenty"	20	9	9	0	3	3	0	35.0	30.0	15.0	15.0
"Intermediate"	134	116	18	98	39	18	21	49.3	13.4	24.6	6.7
"Developing"	65	32	0	32	25	3	22	29.2	0.0	27.7	4.6

Source: Higher Education Panel, "Survey of Changes in Graduate Programs in Higher Education," American Council on Education, 1972.

Table 5

Doctoral Programs Initiated, Eliminated, and Inactive, by Field

Field	Change in Number of Programs						Programs Inactive In 1970-71 or 1971-72
	1970-1972			1972-1974			
	Number Started	Number Eliminated	Net Change	Number Started	Number Eliminated	Net Change	
Arts and humanities:	45	8	37	22	11	11	4
Language arts	28	5	23	6	8	-2	0
Humanities	7	3	4	7	3	4	0
Fine arts	10	0	10	9	0	9	4
Education	21	5	16	12	0	12	0
Business administration	13	0	13	3	0	3	0
Health	9	3	6	6	0	6	0
Science and engineering:	163	27	136	83	29	54	9
Engineering	19	15	4	17	3	14	2
Life sciences:	34	9	25	35	6	29	7
Basic medical	11	6	5	19	3	16	3
Other	23	3	20	16	3	13	4
Mathematical sciences:	29	0	29	8	0	8	0
Math and statistics	5	0	5	3	0	3	0
Computer science	24	0	24	5	0	5	0
Physical sciences:	37	0	37	20	8	12	0
Physics and astronomy	2	0	2	2	5	-3	0
Chemistry	18	0	18	11	3	8	0
Other	17	0	17	7	0	7	0
Social sciences:	44	3	41	3	12	-9	0
Psychology	22	0	22	3	6	-3	0
Other	22	3	19	0	6	-6	0
All other fields	2	0	2	0	0	0	0

Source: Higher Education Panel, "Survey of Changes in Graduate Programs in Higher Education," American Council on Education, 1972.

Table 6

The Relation of Changes in Doctoral Programs to Number of Institutions and to Estimated Number of Departments, by Field

Field	%age of Institutions Reporting Programs Started		%age of Estimated Departments in Field Reporting Programs Started		%age of Institutions Reporting Programs Eliminated		%age of Estimated Departments in Field Reporting Programs Eliminated	
	1970-72	1972-74	1970-72	1972-74	1970-72	1972-74	1970-72	1972-74
Arts and humanities:	3.8	2.2	NA	NA	1.0	1.0	NA	NA
Language arts	3.1	0.7	NA	NA	0.6	1.0	NA	NA
Humanities	0.9	0.9	NA	NA	0.4	0.4	NA	NA
Fine arts	1.2	1.1	NA	NA	0.0	0.0	NA	NA
Education	2.2	1.5	NA	NA	0.6	0.0	NA	NA
Business administration	1.6	0.4	NA	NA	0.0	0.0	NA	NA
Health	1.1	0.7	NA	NA	0.4	0.0	NA	NA
Science and engineering:	12.1	8.6	4.6	2.3	3.0	2.5	0.8	0.8
Engineering	2.3	2.1	2.5	2.2	1.8	0.4	2.0	0.4
Life sciences:	3.8	3.1	3.0	3.1	1.1	0.4	0.8	0.5
Basic medical	1.4	2.3	1.7	2.9	0.7	0.4	0.9	0.5
Other	2.5	1.1	4.6	3.2	0.4	0.4	0.6	0.6
Mathematical sciences:	3.2	1.0	11.8	3.3	0.0	0.0	0.0	0.0
Math and statistics	0.6	0.4	2.6	1.6	0.0	0.0	0.0	0.0
Computer science	2.6	0.6	45.3	9.4	0.0	0.0	0.0	0.0
Physical sciences:	4.4	2.5	5.7	3.1	0.0	1.0	0.0	1.2
Physics and astronomy	0.2	0.2	0.9	0.9	0.0	0.6	0.0	2.2
Chemistry	2.2	1.4	8.5	5.2	0.0	0.4	0.0	1.4
Other	2.1	0.9	8.3	3.4	0.0	0.0	0.0	0.0
Social sciences:	5.0	0.4	5.8	0.4	0.4	1.1	0.4	1.6
Psychology	2.7	0.4	13.8	1.9	0.0	0.4	0.0	3.8
Other	2.7	0.0	3.6	0.0	0.4	0.7	0.5	1.0
All other fields	0.2	0.0	NA	NA	0.0	0.0	NA	NA

Source: Higher Education Panel, "Survey of Changes in Graduate Programs in Higher Education," American Council on Education, 1972.

Table 7

Reported Reasons for Starting Doctoral Programs, 1970-1974

	Number of Times Reason Was Given By:		
	All Institutions	Public Institutions	Private Institutions
Principal reasons:			
Development of new field or area	86	45	41
Part of institutional long-range plan	64	54	10
National job market	51	49	2
Student pressures for new program	46	44	2
Faculty wishes	45	25	20
Quality of existing or available faculty	45	32	13
Local job market	17	14	3
Recommendation of academic community	13	13	0
Balance necessary for execution of other programs	9	3	6
Budgetary considerations	2	0	2
Legislative enactment	0	0	0
Community pressures	0	0	0
Lack of student interest	0	0	0
Reductions in Federal support	0	0	0
Other contributing reasons:			
Faculty wishes	117	110	7
Quality of existing or available faculty	87	78	9
Part of institutional long-range plan	58	52	6
National job market	55	50	5
Balance necessary for execution of other programs	49	46	3
Recommendation of academic community	27	27	0
Student pressures	25	25	0
Development of new field or area	24	20	4
Community pressures	22	20	2
Local job market	18	18	0
Budgetary considerations	6	6	0
Lack of student interest	2	0	2
Legislative enactment	0	0	0
Reductions in Federal support	0	0	0

Source: Higher Education Panel, "Survey of Changes in Graduate Programs in Higher Education," American Council on Education, 1972.

Table 8

Reported Reasons for Eliminating Doctoral Programs, 1970-1974

	Number of Times Reason Was Given By:		
	All Institutions	Public Institutions	Private Institutions
Principal reasons:			
Lack of student interest	27	21	6
Budget considerations	13	0	13
Quality of existing or available faculty	11	11	0
Faculty wishes	11	9	2
National job market	8	3	5
Balance necessary for execution of other programs	6	6	0
Development of new field or area	3	0	3
Part of institutional long-range plan	3	0	3
Recommendation of academic community	0	0	0
Legislative enactment	0	0	0
Student pressures for new program	0	0	0
Community pressures	0	0	0
Local job market	0	0	0
Reductions in Federal support	0	0	0
Other contributing reasons:			
Budgetary considerations	6	3	3
Recommendation of academic community	6	6	0
Lack of student interest	5	0	5
Local job market	3	3	0
National job market	3	0	3
Development of new field or area	3	0	3
Community pressures	3	0	3
Quality of existing or available faculty	2	0	2
Part of institutional long-range plan	2	0	2
Legislative enactment	0	0	0
Student pressures	0	0	0
Faculty wishes	0	0	0
Balance necessary for execution of other programs	0	0	0
Reductions in Federal support	0	0	0

Source: Higher Education Panel, "Survey of Changes in Graduate Programs in Higher Education," American Council on Education, 1972.

Table 9

Principal Reported Reasons for Starting Doctoral Programs, by Field, 1970-1974

	Number of Times Reason Was Given for:										
	All Fields	Arts and Humanities	Education	Business Administration	Health	Engineering	Life Sciences	Mathematical Sciences	Physical Sciences	Social Sciences	All Other Field
Legislative enactment	0	0	0	0	0	0	0	0	0	0	0
Student pressures for new program	46	2	6	0	0	0	7	0	0	31	0
Community pressures	0	0	0	0	0	0	0	0	0	0	0
Local job market	17	0	0	3	0	0	3	3	8	0	0
National job market	51	6	0	0	0	8	6	3	26	2	0
Faculty wishes	45	17	2	0	3	3	7	0	5	6	2
Development of new field or area	86	25	3	3	10	5	12	20	8	0	0
Balance necessary for execution of other programs	9	0	0	0	0	3	0	3	0	3	0
Quality of existing or available faculty	45	9	3	2	0	3	17	8	3	0	0
Part of institutional long-range plan	64	6	18	8	2	12	10	0	3	5	0
Lack of student interest	0	0	0	0	0	0	0	0	0	0	0
Reductions in Federal support	0	0	0	0	0	0	0	0	0	0	0
Budgetary considerations	2	0	0	0	0	0	2	0	0	0	0
Recommendation of academic community	13	0	0	0	0	3	7	0	0	0	3

Source: Higher Education Panel, "Survey of Changes in Graduate Programs in Higher Education," American Council on Education, 1972.

Table 10

Other Contributing Reported Reasons for Starting Doctoral Programs by Field, 1970-1974

	Number of Times Reason Was Given for:										
	All Fields	Arts and Humanities	Education	Business Administration	Health	Engineering	Life Sciences	Mathematical Sciences	Physical Sciences	Social Sciences	All Other Fields
Legislative enactment	0	0	0	0	0	0	0	0	0	0	0
Student pressures for new program	25	3	3	0	0	0	3	10	3	3	0
Community pressures	22	0	7	0	3	0	3	0	0	9	0
Local job market	18	0	3	0	3	0	6	0	0	6	0
National job market	55	2	0	3	3	3	22	6	3	13	0
Faculty wishes	117	11	10	0	3	8	35	12	17	21	0
Development of new field or area	24	3	0	2	3	0	0	0	11	5	0
Balance necessary for execution of other programs	49	9	3	0	0	0	20	0	7	10	0
Quality of existing or available faculty	87	11	10	3	3	2	28	11	9	10	0
Part of institutional long-range plan	58	6	3	6	0	11	3	5	19	5	0
Lack of student interest	2	0	0	0	0	0	0	0	0	2	0
Reductions in Federal support	0	0	0	0	0	0	0	0	0	0	0
Budgetary considerations	6	0	0	0	0	0	0	3	3	0	0
Recommendation of academic community	27	3	0	0	0	0	6	9	6	3	0

Source: Higher Education Panel, "Survey of Changes in Graduate Programs in Higher Education," American Council on Education, 1972.

Table 11

Principal Reported Reasons for Eliminating Doctoral Programs, by Field, 1970-1974

	Number of Times Reason Was Given for:										
	All Fields	Arts and Humanities	Education	Business Administration	Health	Engineering	Life Sciences	Mathematical Sciences	Physical Sciences	Social Sciences	All Other Field
Legislative enactment	0	0	0	0	0	0	0	0	0	0	0
Student pressures for new program	0	0	0	0	0	0	0	0	0	0	0
Community pressures	0	0	0	0	0	0	0	0	0	0	0
Local job market	0	0	0	0	0	0	0	0	0	0	0
National job market	8	5	0	0	0	3	0	0	0	0	0
Faculty wishes	11	3	5	0	0	0	0	0	0	3	0
Development of new field or area	3	0	0	0	0	0	3	0	0	0	0
Balance necessary for execution of other programs	6	0	0	0	0	0	6	0	0	0	0
Quality of existing or available faculty	11	6	0	0	0	0	0	0	5	0	0
Part of institutional long-range plan	3	0	0	0	0	0	3	0	0	0	0
Lack of student interest	27	9	9	9	3	15	3	0	3	3	0
Reductions in Federal support	0	0	0	0	0	0	0	0	0	0	0
Budgetary considerations	13	5	0	0	0	0	0	0	0	8	0
Recommendation of academic community	0	0	0	0	0	0	0	0	0	0	0

Source: Higher Education Panel, "Survey of Changes in Graduate Programs in Higher Education," American Council on Education, 1972.

Table 12

Other Contributing Reported Reasons for Eliminating Doctoral Programs, by Field, 1970-1974

	Number of Times Reason Was Given for:										
	All Fields	Arts and Humanities	Education	Business Administration	Health	Engineering	Life Sciences	Mathematical Sciences	Physical Sciences	Social Sciences	All Other Field
Legislative enactment	0	0	0	0	0	0	0	0	0	0	0
Student pressures for new program	0	0	0	0	0	0	0	0	0	0	0
Community pressures	3	0	0	0	0	0	0	0	3	0	0
Local job market	3	0	0	0	0	3	0	0	0	0	0
National job market	3	0	0	0	0	0	0	0	3	0	0
Faculty wishes	0	0	0	0	0	0	0	0	0	0	0
Development of new field or area	3	0	0	0	0	0	0	0	3	0	0
Balance necessary for execution of other programs	0	0	0	0	0	0	0	0	0	0	0
Quality of existing or available faculty	2	2	0	0	0	0	0	0	0	0	0
Part of institutional long-range plan	2	0	0	0	0	0	0	0	0	2	0
Lack of student interest	5	2	0	0	0	0	0	0	3	0	0
Reductions in Federal support	0	0	0	0	0	0	0	0	0	0	0
Budgetary considerations	6	0	0	0	0	6	0	0	0	0	0
Recommendation of academic community	6	0	0	0	0	3	3	0	0	0	0

Source: Higher Education Panel, "Survey of Changes in Graduate Programs in Higher Education," American Council on Education, 1972.

Table 13

Changes in Master's Programs, by Type and Control of Institution

Type and Control	N	Change in Number of Programs						Percentage of Institutions:			
		1970-1972			1972-1974			1970-1972		1972-1974	
		Number Started	Number Eliminated	Net Change	Number Expected To Be Started	Number Expected To Be Eliminated	Net Change	Started Programs	Eliminated Programs	Expect to Start Programs	Expect to Eliminate Programs
All institutions:	813	965	171	794	349	131	218	51.2	15.1	20.5	12.4
Public	412	769	71	698	262	29	233	71.4	14.6	27.7	5.6
Private	401	196	100	96	87	102	-15	30.4	15.7	13.2	19.5
Universities:	219	387	76	311	148	70	78	75.8	29.7	32.9	21.5
Public	147	288	49	239	128	29	99	79.6	33.3	36.7	15.6
Private	72	99	27	72	20	41	-21	68.1	22.2	25.0	33.3
4-year colleges:	594	578	95	483	201	61	140	42.1	9.8	16.0	9.1
Public	265	481	22	459	134	0	134	66.8	4.2	22.6	0.0
Private	329	97	73	24	67	61	6	22.2	14.3	10.6	16.4

Source: Higher Education Panel, "Survey of Changes in Graduate Programs in Higher Education," American Council on Education, 1972.

Table 14

Changes in Science and Engineering Master's Programs, by Type and Control of Institution

Type and Control	N	Change in Number of Programs						Percentage of Institutions:			
		1970-1972			1972-1974			1970-1972		1972-1974	
		Number Started	Number Eliminated	Net Change	Number Expected To Be Started	Number Expected To Be Eliminated	Net Change	Started Programs	Eliminated Programs	Expect to Start Programs	Expect to Eliminate Programs
All institutions:	813	339	83	256	156	26	130	29.5	8.4	14.9	2.7
Public	412	277	41	236	130	0	130	47.1	10.0	23.8	0.0
Private	401	62	42	20	26	26	0	11.5	6.7	5.7	5.5
Universities:	219	154	54	100	87	13	74	48.4	19.6	27.4	5.0
Public	147	108	37	71	79	0	79	51.7	25.2	35.4	0.0
Private	72	46	17	29	8	13	-5	41.7	8.3	11.1	15.3
4-year colleges:	594	185	29	156	69	13	56	22.6	4.2	10.3	1.9
Public	265	169	4	165	51	0	51	44.5	1.5	17.4	0.0
Private	329	16	25	-9	18	13	5	4.9	6.4	4.6	3.3

Source: Higher Education Panel, "Survey of Changes in Graduate Programs in Higher Education," American Council on Education, 1972.

Table 15

Master's Programs Initiated, Eliminated, and Inactive, by Field

Field	Change in Number of Programs						Programs Inactive In 1970-71 or 1971-72
	1970-1972			1972-1974			
	Number Started	Number Eliminated	Net Change	Number Started	Number Eliminated	Net Change	
Arts and humanities:	260	34	226	50	58	-8	31
Language arts	142	20	122	19	23	-4	6
Humanities	62	14	48	7	30	-23	20
Fine arts	56	0	56	24	5	19	5
Education	237	28	209	88	25	63	6
Business administration	71	9	62	36	3	33	0
Health	33	9	24	13	11	2	3
Science and engineering:	339	83	256	156	26	130	27
Engineering	48	41	7	29	5	24	0
Life sciences:	35	13	22	35	5	30	8
Basic medical	6	3	3	10	0	10	5
Other	29	10	19	25	5	20	3
Mathematical sciences:	70	7	63	19	0	19	0
Math and statistics	59	7	52	12	0	12	0
Computer science	11	0	11	7	0	7	0
Physical sciences:	66	7	59	13	4	9	13
Physics and astronomy	18	7	11	8	0	8	4
Chemistry	2	0	2	5	2	3	3
Other	46	0	46	0	2	-2	6
Social sciences:	120	15	105	60	12	48	6
Psychology	41	6	35	8	3	5	0
Other	79	9	70	52	9	43	6
All other fields	25	8	17	6	8	-2	0

Source: Higher Education Panel, "Survey of Changes in Graduate Programs in Higher Education," American Council on Education, 1972.

Table 16

The Relation of Changes in Master's Programs to Number of Institutions and to Estimated Number of Departments, by Field

Field	%age of Institutions Reporting Programs Started		%age of Estimated Departments in Field Reporting Programs Started		%age of Institutions Reporting Programs Eliminated		%age of Estimated Departments in Field Reporting Programs Eliminated	
	1970-72	1972-74	1970-72	1972-74	1970-72	1972-74	1970-72	1972-74
Arts and humanities:	20.7	6.2	NA	NA	3.3	6.0	NA	NA
Language arts	14.1	2.3	NA	NA	2.5	2.6	NA	NA
Humanities	7.3	0.9	NA	NA	1.7	3.3	NA	NA
Fine arts	6.5	3.0	NA	NA	0.0	0.6	NA	NA
Education	18.6	9.1	NA	NA	3.2	2.8	NA	NA
Business administration	8.5	3.3	NA	NA	1.1	0.4	NA	NA
Health	2.8	1.6	NA	NA	1.1	1.0	NA	NA
Science and engineering:	29.5	14.9	5.7	2.6	8.4	2.7	1.4	0.4
Engineering	5.5	3.6	4.3	2.6	4.1	0.6	3.7	0.4
Life sciences:	4.3	4.3	2.4	2.4	1.6	0.6	0.9	0.3
Basic medical	0.7	1.2	0.9	1.4	0.4	0.0	0.4	0.0
Other	3.6	3.1	3.7	3.2	1.2	0.6	1.3	0.6
Mathematical sciences:	8.6	2.3	13.9	3.8	0.9	0.0	1.4	0.0
Math and statistics	7.3	1.5	13.7	2.8	0.9	0.0	1.6	0.0
Computer science	1.4	0.9	15.1	9.6	0.0	0.0	0.0	0.0
Physical sciences:	7.4	1.6	5.5	1.1	0.9	0.5	0.6	0.3
Physics and astronomy	2.2	1.0	4.4	2.0	0.9	0.0	1.7	0.0
Chemistry	0.2	0.6	0.5	1.3	0.0	0.2	0.0	0.5
Other	5.7	0.0	10.8	0.0	0.0	0.2	0.0	0.5
Social sciences:	14.1	7.4	7.6	3.8	1.8	1.2	1.0	0.8
Psychology	5.0	1.0	13.7	2.7	0.7	0.4	2.0	1.0
Other	9.5	6.4	6.2	4.1	1.1	0.9	0.7	0.7
All other fields	3.1	0.7	NA	NA	1.0	1.0	NA	NA

Source: Higher Education Panel, "Survey of Changes in Graduate Programs in Higher Education," American Council on Education, 1972.

Table 17

Reported Reasons for Starting Master's Programs, 1970-1974

	Number of Times Reason Was Given By:		
	All Institutions	Public Institutions	Private Institutions
Principal reasons:			
Student pressures for new program	320	222	98
Development of new field or area	216	171	45
Faculty wishes	155	128	27
Part of institutional long-range plan	155	135	20
Community pressures	123	106	17
Quality of existing or available faculty	115	115	0
National job market	71	45	26
Recommendation of academic community	62	48	14
Local job market	41	34	7
Balance necessary for execution of other programs	38	20	18
Legislative enactment	6	3	3
Budgetary consideration	4	0	4
Lack of student interest	0	0	0
Reductions in Federal support	0	0	0
Other contributing reasons:			
Faculty wishes	316	279	37
Part of institutional long-range plan	281	253	28
Local job market	231	215	16
Quality of existing or available faculty	201	157	44
Community pressures	194	169	25
Development of new field or area	165	140	25
National job market	160	138	22
Student pressures for new program	160	141	19
Balance necessary for execution of other programs	86	81	5
Recommendation of academic community	30	21	9
Legislative enactment	0	0	0
Lack of student interest	0	0	0
Reductions in Federal support	0	0	0
Budgetary considerations	0	0	0

Source: Higher Education Panel, "Survey of Changes in Graduate Programs in Higher Education," American Council on Education, 1972.

Table 18

Reported Reasons for Eliminating Master's Programs, 1970-1974

	Number of Times Reason Was Given By:		
	All Institutions	Public Institutions	Private Institutions
Principal reasons:			
Lack of student interest	125	52	73
Budgetary considerations	40	6	34
Part of institutional long-range plan	40	14	26
Faculty wishes	22	9	13
Recommendation of academic community	19	9	10
Quality of existing or available faculty	17	0	17
Development of new field or area	16	3	13
National job market	9	3	6
Local job market	5	3	2
Balance necessary for execution of other programs	2	0	2
Legislative enactment	2	0	2
Student pressures for new program	0	0	0
Community pressures	0	0	0
Reductions in Federal support	0	0	0
Other contributing reasons:			
Budgetary considerations	65	3	62
Part of institutional long-range plan	37	9	28
Lack of student interest	30	0	30
Recommendation of academic community	25	9	16
Faculty wishes	14	12	2
Balance necessary for execution of other programs	11	3	8
Quality of existing or available faculty	6	3	3
Local job market	6	3	3
National job market	6	0	6
Development of new field or area	5	3	2
Community pressures	2	0	2
Legislative enactment	0	0	0
Student pressures for new programs	0	0	0
Reductions in Federal support	0	0	0

Source: Higher Education Panel, "Survey of Changes in Graduate Programs in Higher Education," American Council on Education, 1972.

Table 19

Principal Reported Reasons for Starting Master's Programs, by Field, 1970-1974

	Number of Times Reason Was Given for:										
	All Fields	Arts and Humanities	Education	Business Administration	Health	Engineering	Life Sciences	Mathematical Sciences	Physical Sciences	Social Sciences	All Other Fields
Legislative enactment	6	0	3	0	0	0	0	0	3	0	0
Student pressures for new program	320	77	109	32	0	18	3	17	18	40	6
Community pressures	123	5	48	19	0	0	8	13	10	17	3
Local job market	41	2	13	8	3	8	0	0	0	7	0
National job market	71	6	18	0	11	3	2	8	13	10	0
Faculty wishes	155	50	9	13	5	15	5	12	9	34	3
Development of new field or area	216	51	32	14	16	17	17	15	18	21	15
Balance necessary for execution of other programs	38	10	10	0	0	0	0	3	0	11	0
Quality of existing or available faculty	115	37	20	0	3	12	0	0	15	0	0
Part of institutional long-range plan	155	58	15	16	5	9	12	12	8	20	0
Lack of student interest	0	0	0	0	0	0	0	0	0	0	0
Reductions in Federal support	0	0	0	0	0	0	0	0	0	0	0
Budgetary considerations	4	2	0	0	0	0	0	0	0	2	0
Recommendation of academic community	62	8	19	3	6	3	9	8	0	3	3

Source: Higher Education Panel, "Survey of Changes in Graduate Programs in Higher Education," American Council on Education, 1972.

Table 20

Other Contributing Reported Reasons for Starting Master's Programs, by Field, 1970-1974

	Number of Times Reason Was Given for:										
	All Fields	Arts and Humanities	Education	Business Administration	Health	Engineering	Life Sciences	Mathematical Sciences	Physical Sciences	Social Sciences	Other Fields
Legislative enactment	0	0	0	0	0	0	0	0	0	0	
Student pressures for new program	160	31	72	21	0	6	0	9	3	18	
Community pressures	194	40	96	21	3	8	0	3	11	12	
Local job market	231	38	86	28	3	14	8	11	23	20	
National job market	160	39	41	6	9	10	7	8	9	31	
Faculty wishes	316	70	90	24	9	20	15	16	20	47	
Development of new field or area	165	37	29	2	14	5	3	11	17	38	
Balance necessary for execution of other programs	86	24	23	3	6	3	3	9	6	9	
Quality of existing or available faculty	201	65	23	17	3	22	19	11	7	31	
Part of institutional long-range plan	281	69	51	14	13	17	11	29	21	49	
Lack of student interest	0	0	0	0	0	0	0	0	0	0	
Reductions in Federal support	0	0	0	0	0	0	0	0	0	0	
Budgetary considerations	0	0	0	0	0	0	0	0	0	0	
Recommendation of academic community	30	3	7	0	2	0	0	0	3	15	

Source: Higher Education Panel, "Survey of Changes in Graduate Programs in Higher Education," American Council on Education, 1972.

Table 21

Principal Reported Reasons for Eliminating Master's Programs, by Field, 1970-1974

	Number of Times Reason Was Given for:										
	All Fields	Arts and Humanities	Education	Business Administration	Health	Engineering	Life Sciences	Mathematical Sciences	Physical Sciences	Social Sciences	All Other Fields
Legislative enactment	2	0	0	0	0	0	0	0	0	0	0
Student pressures for new program	0	0	0	0	0	0	0	0	0	0	0
Community pressures	0	0	0	0	0	0	0	0	0	0	0
Local job market	5	0	2	0	0	3	0	0	0	0	0
National job market	9	3	0	0	0	3	0	3	0	0	0
Faculty wishes	22	5	2	3	0	0	6	0	0	6	0
Development of new field or area	16	8	0	3	0	0	2	3	0	0	0
Balance necessary for execution of other programs	2	0	2	0	0	0	0	0	0	0	0
Quality of existing or available faculty	17	7	3	0	0	4	0	0	0	3	0
Part of institutional long-range plan	40	12	0	3	5	0	2	0	2	3	13
Lack of student interest	125	33	34	3	13	18	6	0	7	6	0
Reductions in Federal support	0	0	0	0	0	0	0	0	0	0	0
Budgetary considerations	40	9	7	0	2	11	0	0	0	8	3
Recommendation of academic community	19	10	0	0	0	7	0	0	2	0	0

Source: Higher Education Panel, "Survey of Changes in Graduate Programs in Higher Education," American Council on Education, 1972.

Table 22

Other Contributing Reported Reasons for Eliminating Master's Programs by Field, 1970-1974

	Number of Times Reason Was Given for:										
	All Fields	Arts and Humanities	Education	Business Administration	Health	Engineering	Life Sciences	Mathematical Sciences	Physical Sciences	Social Sciences	All Other Fields
Legislative enactment	0	0	0	0	0	0	0	0	0	0	0
Student pressures for new program	0	0	0	0	0	0	0	0	0	0	0
Community pressures	2	0	2	0	0	0	0	0	0	0	0
Local job market	6	3	0	0	0	3	0	0	0	0	0
National job market	6	4	2	0	0	0	0	0	0	0	0
Faculty wishes	14	0	5	0	0	3	3	0	0	0	3
Development of new field or area	5	0	2	0	0	3	0	0	0	0	0
Balance necessary for execution of other programs	11	6	0	0	0	0	0	0	2	0	3
Quality of existing or available faculty	6	3	0	0	0	0	0	0	0	0	3
Part of institutional long-range plan	37	0	5	0	3	17	0	0	0	9	3
Lack of student interest	30	15	2	0	2	2	0	4	2	3	0
Reductions in Federal support	0	0	0	0	0	0	0	0	0	0	0
Budgetary considerations	65	34	8	0	0	9	3	0	2	9	0
Recommendation of academic community	25	6	4	0	0	3	3	0	0	9	0

Source: Higher Education Panel, "Survey of Changes in Graduate Programs in Higher Education," American Council on Education, 1972.

nsf SCIENCE RESOURCES STUDIES HIGHLIGHTS

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Changes in Graduate Programs in Science and Engineering 1970-72 and 1972-1974

The general expectation of a continuing large expansion in the number of graduate programs, particularly in the sciences, of a few years ago, now appears unfounded 1/. A recently completed survey indicates that little expansion in graduate programs in science and engineering occurred in the past 2 years, and even less is expected in the next 2 years.

In examining the findings of the study, caution should be exercised regarding interpretations that go beyond the data. While the number of programs is shown to be increasing, new programs may not involve expansion, but rather the granting of degrees in a newly developed area of science, e.g., biophysics. There was no information collected in the study related to changes in resource requirements due to additions or deletions of programs.

Summary

- During 1970-72 the ratio of net additions in doctoral programs in science and engineering to existing doctoral departments in these areas of study was 1 to 26. However, current plans for the 1972-74 period indicate that this rate of growth will be cut at least in half -- to 1 to 66.
- The "top twenty" universities showed no net change in science and engineering doctoral programs in the 1970-72 period; the "developing" universities showed a net increase equivalent to about one per two universities, while the "intermediate" universities showed the largest relative net increase, equivalent to about one per one and one-half universities. Planning for the 1972-74 period indicates again no change for the "top twenty" and the largest relative increases among "developing" universities.
- During 1970-72 the greatest increase in doctoral programs occurred in computer science and psychology. In plans for 1972-74, computer science emerges again as the field with the greatest expected relative increase.
- The reasons given most often for adding new doctoral programs were the development of a new field and the national job market. Other reasons frequently cited were institutional long-range plans, quality of existing faculty, student pressure, and faculty wishes. The reason most often given for elimination of programs was lack of student interest; budgetary considerations, quality of existing faculty, and faculty wishes were also cited.
- A net increase of 256 master's programs in science or engineering (equivalent to one program per three institutions) was reported for the 1970-72 period; one-half as large a net increase is planned for the following 2 years. Relating these increases to the total number of master's departments in science and engineering shows the 1970-72 net increase to be 1 program for every 23 departments and the planned 1972-74 increase to be 1 for every 46.

Introduction

In order to determine the dynamics of the growth and decline of graduate programs 2/ in higher education, a survey was conducted for the Federal Government by the American Council on Education (ACE) through its Higher Education Panel (HEP). The survey provided information on recent and expected quantitative changes in graduate programs. No previous comparable data were available.

Questionnaires were sent in January 1972 to a sample of 210 institutions, all of which had previously awarded graduate degrees. Among these are those designated as: (a) "universities," i.e., those which give particular stress to graduate instruction and have at least two professional schools, other than technological schools, and (b) "other graduate institutions," i.e., all others with graduate programs. The "universities" account for 94 percent of all doctorates awarded in science and engineering in 1969-70. All figures cited or shown in the tables of this report represent national totals which have been derived from weighting and expanding data received from 198 responding institutions.

[1] See, for example, Mayhew, Lewis B., *The Expansion of Graduate and Professional Education During the Period 1966-1980*, Studies in Future of Higher Education, Report No. 2. New York: The Academy for Educational Development, Inc., 1969, p. 20.

[2] The terms *master's programs* and *doctoral programs* used in this report refer to officially authorized, formally organized programs which terminate with the award of the master's or doctoral degree. Programs need not coincide with departments. A new program should be one that is new in content or requirements, not merely one whose designation has been changed.

IE 003744

Prepared in the Science Education Studies Group,
Division of Science Resources Studies

Reference is made in the report to "top twenty," "intermediate," and "developing" universities. The "top twenty" were designated on the basis of NSF Fellows most frequently selecting these institutions for graduate study and on the basis of the largest amounts of Federal R&D money awarded. These twenty universities accounted for almost one-third of all doctorates in science or engineering in 1969-70. "Developing" universities are those which first awarded science or engineering doctorates in 1960 or later. They accounted for less than 5 percent of all science and engineering doctorates. The remaining universities, in the "intermediate" category, granted about three-fifths of the doctorates in science or engineering.

Findings

Doctoral Programs [3]

Forty-two percent of universities started new doctoral programs in science or engineering in the 1970-72 period [4], but only 25 percent plan new programs in the 1972-74 period [5] (chart 1).

Eleven percent of universities eliminated science or engineering doctoral programs in the 1970-72 period, and 7 percent expect to do so in the 1972-74 period.

More public than private universities (in both absolute and relative terms) have added (1970-72) or plan to add (1972-74) science or engineering doctoral programs. Both groups expect fewer additions in the next 2 years.

The largest number of universities adding new science and engineering doctoral programs in the 1970-72 period relative to the number of institutions in the category was among the "intermediate" and "top twenty" institutions. However, the elimination of programs was much more prevalent among the "top twenty." In the next 2 years, the highest percentage of additions is expected among the "developing" universities.

The patterns of net changes in additions and eliminations of doctoral programs are shown in chart 2.

The largest number of new doctoral programs started in 1970-72 was reported in computer science, other life sciences, psychology, and other social sciences. The largest number of programs eliminated was reported in engineering. One-half as many programs in all science or engineering fields combined are expected to be started in the 1972-74 period as were started in the 1970-72 period. However, the number of programs added in the life sciences and engineering will be about the same in both periods. The number of science and engineering programs eliminated in both periods is expected to be about the same (table 1).

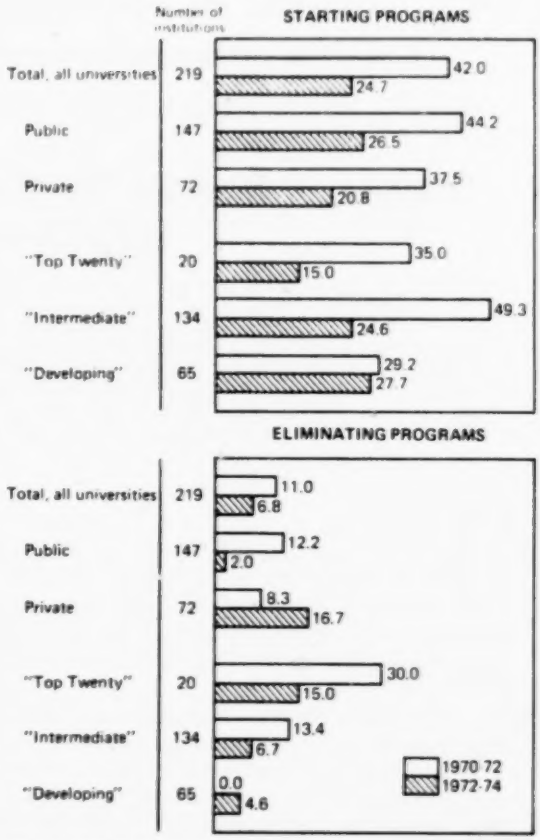
The net change in number of doctoral programs in relation to the estimated number of doctoral departments in the field in the 1970-72 period was highest in computer science and psychology and lowest in physics and astronomy. The net increase in number of science and engineering doctoral programs in relation to the

[3] Data on numbers of doctoral programs added or eliminated by universities and other graduate institutions are shown in table 3 at the end of the report.

[4] In academic years 1970-71 or 1971-72.

[5] In academic years 1972-73 or 1973-74.

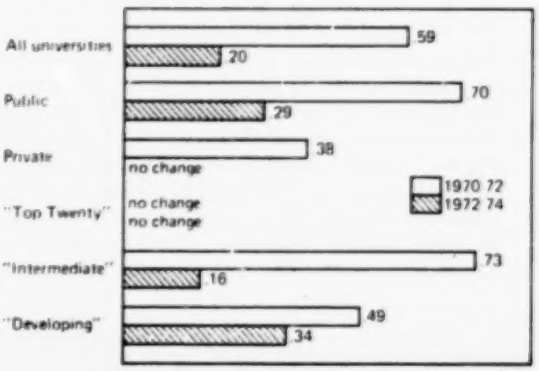
Chart 1. Percent of universities starting and eliminating science and engineering doctoral programs, 1970-72 and 1972-74



SOURCE: ACE Higher Education Panel, Survey of Changes in Graduate Programs in Higher Education, 1972.

Chart 2. Average net increase [4] in number of science or engineering doctoral programs per institution, 1970-72 and 1972-74

(Normalized in terms of total number of institutions in each group)



[4] Net effect of starting and eliminating programs.

SOURCE: ACE Higher Education Panel, Survey of Changes in Graduate Programs in Higher Education, 1972.

Table 1. *Changes in numbers of science and engineering doctoral programs, by field, 1970-72 and 1972-74*

Field	1970-72				1972-74			
	Number started	Number eliminated	Net change		Number started	Number eliminated	Net change	
			Number	Per 100 estimated departments in field			Number	Per 100 estimated departments in field
Science and engineering	163	27	136	3.8	83	29	54	1.5
Engineering	19	15	4	.5	17	3	14	1.8
Life sciences	34	9	25	2.2	35	6	29	2.5
Basic medical sciences	11	6	5	.8	19	3	16	2.5
Other life sciences a/	23	3	20	4.0	16	3	13	2.6
Mathematical sciences	29	0	29	11.8	8	0	8	3.3
Math and statistics	5	0	5	2.6	3	0	3	1.6
Computer sciences	24	0	24	45.3	5	0	5	9.4
Physical sciences	37	0	37	5.7	20	8	12	1.9
Physics and astronomy	2	0	2	.9	2	5	-3	-1.3
Chemistry	18	0	18	8.5	11	3	8	3.8
Other physical sciences b/	17	0	17	8.3	7	0	7	3.4
Social sciences	44	3	41	5.4	3	12	-9	-1.2
Psychology	22	0	22	13.8	3	6	-3	-1.9
Other social sciences c/	22	3	19	3.2	0	6	-6	-1.0

[a] Includes agriculture, forestry, biology, botany, zoology, ecology, embryology, entomology, genetics, nutrition, plant pathology, plant physiology, food sciences, etc.

[b] Includes earth sciences, environmental science, geology, geophysics, meteorology, etc.

[c] Includes sociology, anthropology, political science, area studies, urban studies, criminal justice administration, economics, social science, human relations, etc.

SOURCE: ACE Higher Education Panel, *Survey of Changes in Graduate Programs in Higher Education*, 1972.

number of doctoral departments was 1 program for every 26 departments for the 1970-72 period and is expected to be 1 for every 66 departments for the 1972-74 period.

The reasons cited for initiating new doctoral programs in science and engineering were most often the development of a new field or area, or to meet the needs of a national job market. Other principal reasons offered in order of frequency of citation were student pressures, quality of available faculty, institutional long-range plans, faculty wishes, the local job market, recommendations of the academic community, balance necessary for operation of other programs, and budgetary considerations. The contributing factor cited most often was the faculty's wishes. Elimination of doctoral programs was associated most frequently with lack of student interest and budgetary considerations.

Master's Programs

Thirty percent of the institutions started new master's programs in science or engineering in the 1970-72 period, and one-half as many (15 percent) plan new master's programs in 1972-74. Eight percent of the institutions eliminated master's programs in the 1970-72 period; 3 percent expect to do so in the 1972-74 period.

Table 2 shows comparable data for the various types of institutions. The additions and eliminations cited above for the 1970-72 period result in the net increases for the various types of institutions as shown in chart 3.

The fields in which new master's programs were begun in 1970-72 differ markedly from those in which new doctoral programs were started. The largest number of new master's programs were in social sciences, other than psychology; mathematics and statistics; engineering; and other physical sciences. However, in engineering almost as many master's programs were eliminated as were begun; in the three other fields cited, comparatively few master's programs were eliminated. Overall, the net increase in number of science and engineering master's programs -- in relation to the number of master's departments -- was 1 for every 23 for the 1970-72 period; it is expected to be 1 for every 46 for the 1972-74 period.

The largest net increase in number of master's programs relative to the number of master's departments in

Table 2. *Percent of institutions starting or eliminating science and engineering master's programs, 1970-72 and 1972-74*

Type of institution	Number of institutions a/	1970-72		1972-74	
		Percent starting	Percent eliminating	Expected percent starting	Expected percent eliminating
Total, all institutions	813	29.5	8.4	14.9	2.7
Public	412	47.1	10.0	23.8	0.0
Private	401	11.5	6.7	5.7	5.5
Universities	219	48.4	19.6	27.4	5.0
Other graduate institutions	594	22.6	4.2	10.3	1.9

[a] Some institutions included in categories other than "universities" may not offer graduate degrees in science or engineering. It is estimated that approximately one-half of the "other graduate institutions" offer no graduate programs in science or engineering.

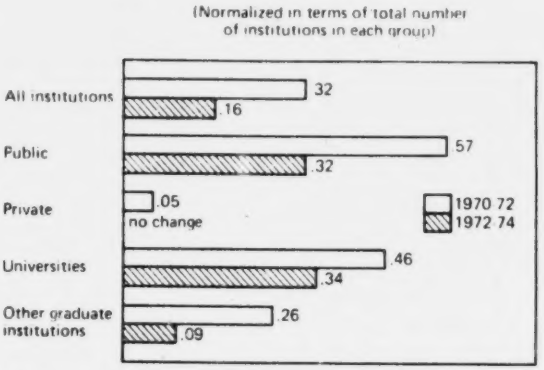
Note: See table 3 for number of master's programs added or eliminated.

SOURCE: ACE Higher Education Panel, *Survey of Changes in Graduate Programs in Higher Education*, 1972.

the field were reported for 1970-72 in computer science, mathematics and statistics, and psychology; the smallest net increases in relation to the number of departments were in basic medical sciences and chemistry.

The reasons given most often for starting new science and engineering master's programs were somewhat different from those given for starting doctor's programs. The reason most frequently cited was student pressure for new programs. Development of a new field or area and faculty wishes were also frequently cited. Other reasons in order of frequency were institutional long-range plans, community pressures, the national job market, quality of available faculty, and recommendations of the academic community. As in the case of doctoral programs, the elimination of master's programs was associated most frequently with lack of student interest and budgetary considerations.

Chart 3. Average net increase [a/] in number of science or engineering master's programs per institution, 1970-72 and 1972-74



[a/] Net effect of starting and eliminating programs.
SOURCE: ACE Higher Education Panel, Survey of Changes in Graduate Programs in Higher Education, 1972.

Table 3. *Estimated number of science and engineering programs started and eliminated, by type and rating of institution, and by level of program, 1970-72 and 1972-74*

Type of institution	Number of institutions	Doctoral programs				Master's programs			
		1970-72		1972-74		1970-72		1972-74	
		Number of programs --		Expected number of programs to be --		Number of programs --		Expected number of programs to be --	
		Started	Elim.	Started	Elim.	Started	Elim.	Started	Elim.
Total, all institutions	813	163	27	83	29	339	83	156	26
Universities	219	157	27	67	24	154	54	87	13
Public	147	124	21	52	9	108	37	79	0
Private	72	33	6	15	15	46	17	8	13
"Top Twenty"	20	9	9	3	3	--	--	--	--
"Intermediate"	134	116	18	39	18	--	--	--	--
"Developing"	65	32	0	25	3	--	--	--	--
Other graduate institutions a/	594	6	0	16	5	185	29	69	13

[a/] Some institutions classified as "other graduate institutions" may not offer graduate degrees in science or engineering. It is estimated that approximately one-half of the "other graduate institutions" offer no graduate programs in science or engineering.

SOURCE: ACE Higher Education Panel, *Survey of Changes in Graduate Programs in Higher Education*, 1972.

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